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Conference Abstract

The Additivity Project - Use Cases and User Interface

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Abstract

Herbarium specimens are central to botanical science and of rising importance thanks to increasing accessibility and broadened usability. Alongside the many new uses of specimen data, sit a range of traditional uses supporting the collection of morphological data and their application to taxonomy and systematics. (Henning et al. 2018). Technical workflows are needed to support the sustainable collection of this traditional information and maintain the high quality of the morphological data. Data exchange and re-usability requires the use of accepted controlled vocabularies (community approved) that are accessible (web-based ontologies and term vocabularies) and reliable (long-term availability/unique identifiers). The same applies to datasets that must be stored accessibly and sustainably by maintaining all data relationships that would facilitate convenient re-use.

This project aims to construct a comprehensive workflow to optimise the delimitation and characterisation (“descriptions”) of taxa (see complementary talk by Plitzner et al.). It is implemented on the open-source software framework of the EDIT Platform for Cybertaxonomy (http://www.cybertaxonomy.org, Ciardelli et al. 2009) extending the

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workflow for sample data processing developed in a preceding project (Kilian et al. 2015). The principal goals of this new software component are:

- specimen-level recording and storage of character data in structured character matrices
- generating taxon characterisations by aggregating the individual specimen-based datasets
- using and developing community-coordinated, ontology-based exemplar vocabularies
- persistently linking character datasets with source specimens for high visibility and re-usability

The angiosperm order, Caryophyllales, provides an exemplar use case through cooperation with the Global Caryophyllales Initiative (Borsch et al. 2015). A basic set of morphological terms and vocabularies has been obtained from various online sources (ontologies, glossaries) and can be used, searched and expanded in the EDIT platform. The terms are categorised into: structures, properties and states. Different editors have been developed to combine structure and property terms to characters and assign a customised state vocabulary (categorical) or suitable values and units (numerical) to them.

The workflow is built around a data set defining the taxonomic environment of individual use cases. A data set is specified by the characters and a taxonomic group, which can be filtered by area or rank. The dataset can be opened in a tabular representation (character matrix) to enter preselected state terms or values for the individual specimen. The matrix provides several features for basic comparison and analysis and allows the entry of alternative datasets (e.g. literature). Finally, the aggregation of data subsets to potential taxonomic units by adding up the values and summarising character states, allows the convenient test of taxonomic hypotheses. The term additivity is used here to describe this set of workflows and processes adding value to herbarium specimens and accumulating the specimen data for a taxon description.

Keywords

specimen, character data, taxonomic workflow, taxon descriptions, EDIT Platform for Cybertaxonomy

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